

IN THE CLAIMS

1. (original) A method for determining whether a projection is truncated, said method comprising:

calculating a sum of all samples at each projection view of a scan of an object;

determining a maximum value of the calculated sums;

averaging a plurality of samples m at a projection view index k when the sum of all samples at index k is less than a predetermined percentage of the maximum value;

comparing the average to a threshold t ;

determining the projection truncated when the average is greater than t ;
and

determining the projection not truncated when the average is not greater than t .

2. (original) A method in accordance with Claim 1 further comprising augmenting partially sampled field of view data using fully sampled field of view data when the projection is determined truncated.

3. (original) A method in accordance with Claim 1 wherein said comparing the average to a threshold t comprises comparing the average to a threshold t , wherein t is between about .25 and about .58.

4. (original) A method in accordance with Claim 3 wherein said comparing the average to a threshold t comprises comparing the average to a threshold t , wherein t is between about .33 and about .5.

5. (original) A method in accordance with Claim 4 wherein said comparing the average to a threshold t comprises comparing the average to a threshold t , wherein t is between about .375 and about .46.

6. (original) A method in accordance with Claim 5 wherein said comparing the average to a threshold t comprises comparing the average to a threshold t , wherein t is about .42.

7. (original) A method in accordance with Claim 1 further comprising estimating a total attenuation $\tau(k)$ using a plurality of projection views.

8. (original) A method in accordance with Claim 7 wherein said estimating a total attenuation $\tau(k)$ using a plurality of projection views comprises estimating a total attenuation $\tau(k)$ in accordance with:

$$\tau(k) = \frac{k_2 - k}{k_2 - k_1} \xi(k_1) + \frac{k - k_1}{k_2 - k_1} \xi(k_2)$$

where k_1 and k_2 are view locations of un-truncated views adjacent to a truncation region comprising at least one projection determined truncated, and $\xi(k)$ is calculated as

$$\xi(k) = \sum_{i=1}^N p(i, k).$$

9. (original) A method in accordance with Claim 8 further comprising determining an attenuation difference $\lambda(k)$ in accordance with $\lambda(k) = \tau(k) - \xi(k)$.

10. (original) A method in accordance with Claim 9 further comprising:

calculating an amount of attenuation to add $\eta(k)$ in accordance with

$$\eta(k) = \frac{\pi}{2} R_l^2(k) - x_l(k) p_l(k) - R_l^2(k) \arcsin\left(\frac{x_l(k)}{R_l(k)}\right) + \frac{\pi}{2} R_r^2(k) - x_r(k) p_r(k) - R_r^2(k) \arcsin\left(\frac{x_r(k)}{R_r(k)}\right) \text{ wh}$$

ere $p_l(k)$, and $p_r(k)$, are the magnitude of a left and a right projection boundary samples averaged over multiple views, respectively, and $x_l(k)$, $x_r(k)$, $R_l(k)$, and $R_r(k)$ are a location and radius of a left and right fitted cylinders, respectfully; and

comparing $\eta(k)$ to $\lambda(k)$.

11. (original) A method in accordance with Claim 10 wherein said comparing $\eta(k)$ to $\lambda(k)$ comprises calculating a ratio $\varepsilon(k) = \frac{\eta(k)\mu_w}{\lambda(k)}$ where μ_w is an attenuation coefficient of water, said method further comprising:

comparing $\varepsilon(k)$ to a threshold q ; and

using at least one of $\eta(k)$ and $\lambda(k)$ to correct an image when $\varepsilon(k)$ is not greater than q ; and

not using either of $\eta(k)$ and $\lambda(k)$ to correct an image when $\varepsilon(k)$ is greater than q .

12. (original) A method in accordance with Claim 11 wherein said comparing $\varepsilon(k)$ to a threshold q comprises comparing $\varepsilon(k)$ to a threshold q , wherein q is between about 1.5 and about 2.5.

13. (original) A method in accordance with Claim 11 wherein said comparing $\varepsilon(k)$ to a threshold q comprises comparing $\varepsilon(k)$ to a threshold q , wherein q is between about 1.75 and about 2.25.

14. (original) A method in accordance with Claim 11 wherein said comparing $\varepsilon(k)$ to a threshold q comprises comparing $\varepsilon(k)$ to a threshold q , wherein q is between about 1.9 and about 2.1.

15. (original) A method in accordance with Claim 11 wherein said comparing $\epsilon(k)$ to a threshold q comprises comparing $\epsilon(k)$ to a threshold q , wherein q is about 2.

16. (original) A method in accordance with Claim 11 wherein said using at least one of $\eta(k)$ and $\lambda(k)$ to correct an image when $\epsilon(k)$ is not greater than q comprises using $\eta(k)$ to correct an image when $\epsilon(k)$ is not greater than q .

17. (original) A method in accordance with Claim 11 wherein said not using either of $\eta(k)$ and $\lambda(k)$ to correct an image when $\epsilon(k)$ is greater than q comprises:

calculating a $\eta_n(k)$ based on data regarding a k_1-n view and a k_2+n view, wherein n is an integer;

and correcting an image using the $\eta_n(k)$.

18. (original) A method in accordance with Claim 17, wherein n is between 2 and 8 inclusive.

19. (original) A method in accordance with Claim 17, wherein n is between 3 and 7 inclusive.

20. (original) A method in accordance with Claim 17, wherein n is 5.

21. (original) A method in accordance with Claim 7 wherein said estimating a total attenuation $\tau(k)$ using a plurality of projection views comprises estimating a total attenuation $\tau(k)$ in accordance with:

$$\tau(k) = \frac{k_2 - k}{k_2 - k_1} \xi(k_1) + \frac{k - k_1}{k_2 - k_1} \xi(k_2)$$

where k_1 and k_2 are averages of a plurality of view locations of un-truncated views adjacent to a truncation region comprising at least one projection determined truncated, and $\xi(k)$ is calculated as $\xi(k) = \sum_{i=1}^N p(i, k)$.

22. (currently amended) An imaging apparatus comprising:

a radiation source;

a detector responsive to radiation positioned to receive radiation emitted from said source; and

a computer operationally coupled to said radiation source and said detector, said computer configured to:

~~calculating~~ calculate a sum of all samples at each projection view of a scan of an object;

~~determining~~ determine a maximum value of the calculated sums;

~~averaging~~ average a plurality of samples m at a projection view index k when the sum of all samples at index k is less than a predetermined percentage of the maximum value;

compare the average to a threshold t ;

determine the projection truncated when the average is greater than t ; and

determine the projection not truncated when the average is not greater than

t .

23. (original) An apparatus in accordance with Claim 22 wherein said computer is further configured to compare the average to a threshold t , wherein t is between about .25 and about .58.

24. (original) An apparatus in accordance with Claim 22 wherein said computer is further configured to estimate a total attenuation $\tau(k)$ in accordance with:

$$\tau(k) = \frac{k_2 - k}{k_2 - k_1} \xi(k_1) + \frac{k - k_1}{k_2 - k_1} \xi(k_2)$$

where k_1 and k_2 are view locations of un-truncated views adjacent to a truncation region comprising at least one projection determined truncated, and $\xi(k)$ is

$$\text{calculated as } \xi(k) = \sum_{i=1}^N p(i, k).$$

25. (original) An apparatus in accordance with Claim 22 wherein said computer is further configured to estimate a total attenuation $\tau(k)$ in accordance with:

$$\tau(k) = \frac{k_2 - k}{k_2 - k_1} \xi(k_1) + \frac{k - k_1}{k_2 - k_1} \xi(k_2)$$

where k_1 and k_2 are averages of a plurality of view locations of un-truncated views adjacent to a truncation region comprising at least one projection

determined truncated, and $\xi(k)$ is calculated as $\xi(k) = \sum_{i=1}^N p(i, k)$.

26. (original) An apparatus in accordance with Claim 25 wherein said computer is further configured to:

determine a attenuation difference $\lambda(k)$ in accordance with
 $\lambda(k) = \tau(k) - \xi(k);$

calculate an amount of attenuation to add $\eta(k)$ in accordance with

$$\eta(k) = \frac{\pi}{2} R_l^2(k) - x_l(k) p_l(k) - R_l^2(k) \arcsin\left(\frac{x_l(k)}{R_l(k)}\right) + \frac{\pi}{2} R_r^2(k) - x_r(k) p_r(k) - R_r^2(k) \arcsin\left(\frac{x_r(k)}{R_r(k)}\right)$$
 where $p_l(k)$, and $p_r(k)$, are the magnitude of a left and a right projection boundary samples averaged over multiple views, respectively, and $x_l(k)$, $x_r(k)$, $R_l(k)$, and $R_r(k)$ are a location and radius of a left and right fitted cylinders, respectfully;

compare $\eta(k)$ to $\lambda(k)$ by calculating a ratio $\varepsilon(k) = \frac{\eta(k)\mu_w}{\lambda(k)}$ where μ_w is an attenuation coefficient of water;

compare $\varepsilon(k)$ to a threshold q ;

use at least one of $\eta(k)$ and $\lambda(k)$ to correct an image when $\varepsilon(k)$ is not greater than q ; and

when $\varepsilon(k)$ is greater than q :

calculate a $\eta_n(k)$ based on data regarding a k_1-n view and a k_2+n view, wherein n is an integer; and

correct an image using the $\eta_n(k)$.

27. (original) A computer readable medium encoded with a program configured to instruct a computer to:

calculate a sum of all samples at each projection view of a scan of an object;

determine a maximum value of the calculated sums;

average a plurality of samples m at a projection view index k when the sum of all samples at index k is less than a predetermined percentage of the maximum value;

compare the average to a threshold t ;

determine the projection truncated when the average is greater than t ;

determine the projection not truncated when the average is not greater than t ;

estimate a total attenuation $\tau(k)$ in accordance with

$$\tau(k) = \frac{k_2 - k}{k_2 - k_1} \xi(k_1) + \frac{k - k_1}{k_2 - k_1} \xi(k_2)$$

where k_1 and k_2 are averages of a plurality of view locations of untruncated views adjacent to a truncation region comprising at least one projection

determined truncated, and $\xi(k)$ is calculated as $\xi(k) = \sum_{i=1}^N p(i, k)$;

determine a attenuation difference $\lambda(k)$ in accordance with $\lambda(k) = \tau(k) - \xi(k)$;

calculate an amount of attenuation to add $\eta(k)$ in accordance with

$$\eta(k) = \frac{\pi}{2} R_l^2(k) - x_l(k) p_l(k) - R_l^2(k) \arcsin\left(\frac{x_l(k)}{R_l(k)}\right) + \frac{\pi}{2} R_r^2(k) - x_r(k) p_r(k) - R_r^2(k) \arcsin\left(\frac{x_r(k)}{R_r(k)}\right) \text{ wh}$$

ere $p_l(k)$, and $p_r(k)$, are the magnitude of a left and a right projection boundary samples

averaged over multiple views, respectively, and $x_l(k)$, $x_r(k)$, $R_l(k)$, and $R_r(k)$ are a location and radius of a left and right fitted cylinders, respectfully;

compare $\eta(k)$ to $\lambda(k)$ by calculating a ratio $\varepsilon(k) = \frac{\eta(k)\mu_w}{\lambda(k)}$ where μ_w is an attenuation coefficient of water,

compare $\varepsilon(k)$ to a threshold q ;

use at least one of $\eta(k)$ and $\lambda(k)$ to correct an image when $\varepsilon(k)$ is not greater than q ; and

when $\varepsilon(k)$ is greater than q :

calculate a $\eta_n(k)$ based on data regarding a k_1-n view and a k_2+n view, wherein n is an integer; and

correct an image using the $\eta_n(k)$.